

WHAT IS CLAIMED IS:

1. A working-fluid moving device comprising a first working fluid, a second working fluid, and a housing body including a channel and housing the first working fluid and the second working fluid in the channel;

wherein the housing body includes a deformable portion in which at least a portion of a wall of the channel is deformable so as to cause a change in a sectional shape of the channel, and houses the first working fluid and the second working fluid such that, when the deformable portion is in a first state, the first working fluid is substantially in contact with a portion of an inner wall surface of the channel, the portion corresponding to the deformable portion, and the second working fluid is substantially in contact with the remaining portion of the inner wall surface of the channel;

the first working fluid and the second working fluid are selected such that the first working fluid is inferior to the second working fluid in wettability to the inner wall surface of the channel; and

when the deformable portion in the first state is deformed to assume a second state different from the first state, the first working fluid is moved by means of a repulsive force induced by the inferior wettability of the first working fluid to the inner wall surface of the channel.

2. A working-fluid moving device comprising a first working fluid, a second working fluid, and a housing body comprising at least a pair of opposed walls and housing the first working fluid and the second working fluid in a channel formed by the paired, opposed walls;

wherein the housing body includes a deformable portion in which at least a portion of the paired walls of the channel is deformable so as to

cause a distance between the paired walls to change between a first distance and a second distance shorter than the first distance, and houses the first working fluid and the second working fluid such that, when the distance between the paired walls at the deformable portion assumes the first distance, the first working fluid is substantially in contact with portions of inner surfaces of the paired walls, the portions corresponding to the deformable portion, and the second working fluid is substantially in contact with the remaining portions of the inner surfaces of the paired walls;

the first working fluid and the second working fluid are selected such that the first working fluid is inferior to the second working fluid in wettability to the inner surfaces of the paired walls of the channel; and

when the deformable portion is deformed such that the distance between the paired walls changes from the first distance to the second distance, the first working fluid is moved by means of a repulsive force induced by the inferior wettability of the first working fluid to the inner surfaces of the paired walls.

3. A working-fluid moving device according to claim 1 or 2,
wherein the housing body is configured such that a plurality of deformable portions are formed on a single channel and such that, when each of the deformable portions is deformed, the first working fluid which is substantially in contact with the inner wall surface of the channel at the deformable portion is moved by means of the repulsive force.

4. A working-fluid moving device according to any one of claims 1 to 3,

wherein the first working fluid is an incompressible fluid, and the second working fluid is a compressible fluid.

5. A working-fluid moving device according to any one of claims 1 to 4,

wherein the first working fluid is liquid, and the second working fluid is vapor of the first working fluid.

6. A working-fluid moving device according to any one of claims 1 to 5,

wherein the first working fluid is a liquid metal.

7. A working-fluid moving device according to claim 6,
wherein the liquid metal is mercury or a gallium alloy.

8. A working-fluid moving device according to any one of claims 1 to 7, further comprising an actuator for generating a force which causes deformation of at least a portion of a wall of the deformable portion, wherein at least the portion of the wall to be deformed is a diaphragm.

9. A working-fluid moving device according to any one of claims 1 to 7,

wherein deformable walls of the deformable portion comprise a pair of opposed diaphragms; and

a pair of actuators are fixedly attached to the corresponding diaphragms.

10. A working-fluid moving device according to claim 8 or 9,
wherein the actuator comprises a film-type piezoelectric element
including a piezoelectric/electrostrictive film or an antiferroelectric film.

11. A working-fluid moving device according to any one of claims 8
to 10,
wherein the diaphragm is a ceramic diaphragm.

12. A working-fluid moving device according to any one of claims 1
to 11,
wherein the deformable portion is formed from ceramic.

13. A working-fluid moving device according to any one of claims 1
to 12,
wherein the inner wall surface of the deformable portion is formed
from ceramic.

14. A working-fluid moving device according to any one of claims 1
to 13,
wherein the inner wall surface of the deformable portion is coated
with a material whose wettability to the first working fluid is low.

15. A working-fluid moving device according to any one of claims 1
to 13,
wherein the inner wall surface of the deformable portion is modified

so as to assume inferior wettability to the first working fluid.

16. A working-fluid moving device according to any one of claims 1 to 15,

wherein the channel of the housing body is formed as a closed space, and the housing body comprises a volume change absorptive portion for absorbing a change in volume of the closed space associated with deformation of the deformable portion.

17. A working-fluid moving device according to any one of claims 1 to 16,

wherein deformation of the deformable portion causes the first working fluid in a single mass to break into two or more fluid masses.

18. A working-fluid moving device according to any one of claims 1 to 17,

wherein the first working fluid is an electrically conductive fluid; the second working fluid is an electrically insulative fluid; and at least a pair of terminals are formed such that, before the deformable portion is deformed, the terminals assume one of an electrically connected state, in which the terminals are electrically connected via the first working fluid, and an electrically disconnected state, and such that, after the deformable portion is deformed to cause movement of the first working fluid, the terminals assume the other of the electrically disconnected state and the electrically connected state.

19. A working-fluid moving device according to claim 18,
wherein a plurality of terminal connection-state changeover
elements are formed on a single channel, each terminal connection-state
changeover element comprising the deformable portion and the paired
terminals.